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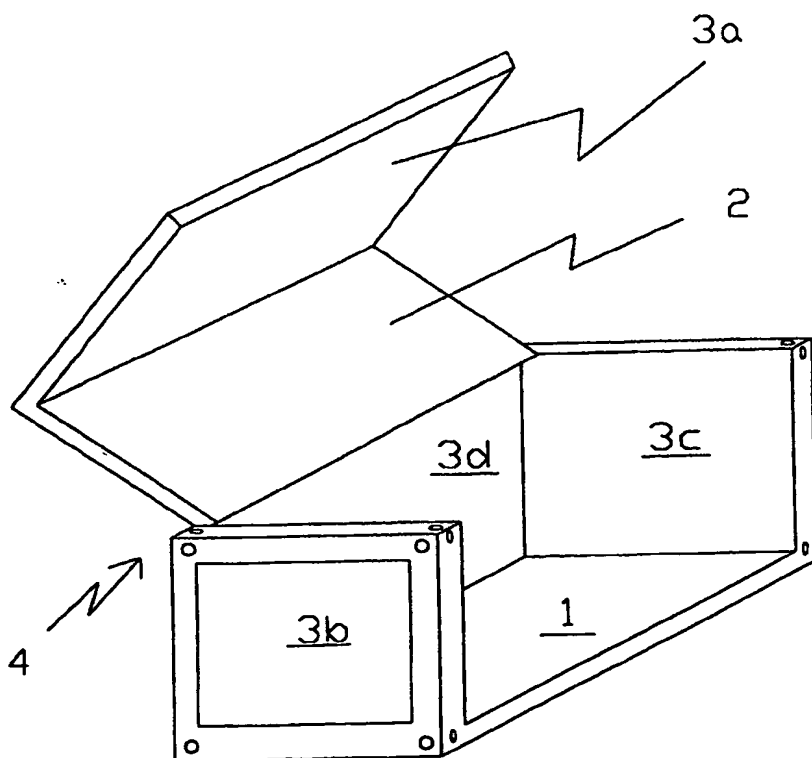
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- (71) Applicant (*for all designated States except US*): **OY LANGH SHIP AB** [FI/FI]; Alaskartano, FIN-21500 Piikkiö (FI).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): **LANGH, Hans** **Published:**  
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[Continued on next page]

(54) Title: **CARGO FREIGHT CONTAINER**



(57) Abstract: The invention relates to a cargo freight container comprising a bottom (1), a top (2) and four walls (3a to 3d). At least part of the top (2) and at least part of one wall (3a) are turnable upwardly off the container in order to open it, and correspondingly, downwardly in order to close it. The container can be loaded from the side and from above, and at the same time, the container can be made so tight that goods can be carried on the deck of a container carrier ship or in a similar place where a tight transport receptacle is required to protect the load.

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## CARGO FREIGHT CONTAINER

### BACKGROUND OF THE INVENTION

[0001] The invention relates to a cargo freight container comprising a bottom, a top and four walls.

5 [0002] In this context, the cargo freight container refers to a sea container or a similar large transport receptacle, which is of the type intended for transporting goods e.g. by container carrier ship, train, truck or barge. Reference throughout this specification to a container is to be taken as a reference to a cargo freight container of the type as described above.

10 [0003] The container size is standardized so that the containers can be stacked one upon the other, handled by standardized handling means and transported by standardized transport systems. Normal container lengths are 20 ft (6095 mm) and 40 ft (12190 mm). Normal container widths are 8 ft (2440 mm) and 2500 mm. A container is normally provided with standard ISO fittings at each corner.

15 [0004] When heavy goods, such as sheet or reeled steel and zinc ingots, are transported in containers, it would be desirable that heavy goods could be loaded in and unloaded from the container both from the side with a fork-lift truck and from above by a hoister, for instance. If it were possible, there would be several options for loading and unloading. It is common that no sufficiently strong fork-lift truck is available but a sufficiently strong hoister is available at most sites. However, loading and unloading is simpler and faster with the fork-lift truck.

20 [0005] Various containers are previously known. For instance, a container which is rectangular in shape and has doors at one end is known. A container with side doors is also known, which doors provide a larger opening for loading and unloading the container. These containers do not enable loading from above with a hoister, and correspondingly, unloading from above with a hoister, because they have a fixed top structure.

30 [0006] Containers with a soft, detachable top are also known, which detachable top enables loading and unloading the container from above. However, lack of tightness is a problem with this solution, and therefore it is not possible to transport goods in the container if it is placed on a ship deck or in a similar unprotected place. A container is also known which has detachable, soft walls and a detachable top. A problem with this known

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solution is the same as in the above-described solution.

#### BRIEF DESCRIPTION OF THE INVENTION

[0007] The object of the invention is to provide a cargo freight container which solves the above problems.

5 [0008] This is achieved with a cargo freight container which is characterized in that at least part of the top and at least part of one wall can be turned upwardly off the container in order to open it, and correspondingly, downwardly in order to close it.

10 [0009] The preferred embodiments of the invention are disclosed in the dependent claims.

[0010] The container of the invention can be loaded both from the side and from above. At the same time the container can be made so tight that goods can be transported on the deck of a container-ship or in a similar place where a tight transport receptacle is required to protect the load.

15 [0011] The container of the invention can be constructed to have a hard exterior, i.e. the top, the walls and the bottom can be made of metal. Hence, the container of the invention protects the load better than the container provided with a soft exterior.

#### LIST OF DRAWINGS

20 [0012] In the following, the invention will be described in greater detail, in connection with preferred embodiments, with reference to the attached drawings, wherein

Figure 1 is a schematic view of a container when it is closed,

Figure 2 shows the container of Figure 1 when it is open,

25 Figure 3 is a schematic side view of a container comprising a rack gear arrangement for opening and closing the container,

Figure 4 is a schematic side view of a container comprising a cogwheel arrangement for opening and closing the container,

30 Figure 5 is a schematic view of a container comprising an arrangement for turning a wall with respect to a turnable top,

Figure 6 is a schematic view of a container comprising an arrangement for turning a wall with respect to a turnable top,

Figure 7 is a schematic side view of a container comprising a hydraulic cylinder arrangement for opening and closing the container,

35 Figure 8 shows a load support,

Figure 9 shows a container with load supports of Figure 8

Figure 10 shows a container with recesses in the bottom for holding cylindrical goods in place in the container, and

Figure 11 is a schematic view of a container comprising a spring arrangement.

#### DETAILED DESCRIPTION OF THE INVENTION

[0013] Figures show a container comprising a bottom 1, a top 2 and four walls 3a to 3d. The container of the figure has the shape of an substantially right-angled box. Any other shape of the container is also possible.

[0014] Preferably, the container is completely made of steel or a similar material. The container is preferably constructed tight so as to protect the contents from the ambient effect.

[0015] The measures of the bottom 1 and the top 2 of the container are preferably selected such that they comply with the standards. The container can for example be 20 or 40 ft long and 8 ft wide. This allows the containers of the invention to be placed on top of standardized containers and vice versa. The height of the container is preferably, but not necessary, lower than the height of an standard container if the container is to be used for transporting heavy goods such as metal in various forms.

[0016] The structure of the container should be firm so that a plurality of containers can be stacked one upon another. The structure of the container should also bear the stress produced by the load transported therein. Standardized containers can be handled and transported by standardized handling and transport means. For this reason is each corner of the container preferably provided with standard ISO fittings for twist locks or similar.

[0017] At least part of the top 2 and at least part of one wall are turnable upwardly. The figures show a container whose top 2 can be substantially completely turned upwardly and whose one wall 3a can be substantially completely turned upwardly together with the top 2. This solution, where the top 2 and the wall 3a are turned substantially completely, facilitates the loading of goods into the container and the unloading therefrom.

[0018] In the figures, the top 2 is attached to the container with a hinge mechanism 4 in the vicinity of the edge (not indicated by a reference

numeral) between a wall 3d and the top 2, said edge being opposite to the edge (not indicated by a reference numeral) between the top 2 to be turned upwardly and the wall 3a to be turned upwardly therewith. Figures 3 and 4 show a container whose top 2 can be turned over 90° such that the wall 3a, which is secured to the top 2, can also be turned completely off the container. This solution facilitates the loading and unloading of the container from above.

[0019] In Figures 2 to 4, the wall 3a to be turned upwardly is secured substantially rigidly to the top 2 to be turned upwardly.

[0020] Alternatively, the wall 3a to be turned upwardly can also be linked with a second hinge mechanism 11 to the top 2 as shown in Figures 5 and 6 such that the top 2 and the wall 3a can be turned against each other when they are turned upwardly off the container. An arrangement of this kind requires less space for loading the container and correspondingly for unloading the contents thereof. For instance, the container can be provided with a turning mechanism (not shown) which automatically turns the top and the wall 3a against each other while they are being turned upwardly off the container. The wall 3a can also be advantageously turned outwardly from the container without that the top 2 is turned upwardly off the container.

[0021] The container preferably comprises a turning arrangement (not indicated by a reference numeral) for turning the top 2 and the wall 3a upwardly off the container and downwardly towards the container. This turning arrangement allows to open and close the container advantageously. In general, the container is constructed of relatively heavy material and therefore this turning arrangement enables one person to open the container manually.

[0022] Figure 3 shows a schematic view of a turning arrangement which comprises a rack gear arrangement. The arrangement comprises a rack 5 engaged in a cogwheel 6. The rack 5 is secured to the top 2. When the cogwheel 6 is turned by means of a crank (not shown) or the like the rack 5 moves and consequently also the top 2 and the wall 3a secured thereto.

[0023] Figure 4 shows a schematic view of a turning arrangement which comprises a cogwheel arrangement. A first lever arm 7 is secured to the top 2 and a second lever arm 9 is rigidly secured to a cogwheel half 8, said second lever arm being secured at its other end to the first lever arm. When the cogwheel 10 is turned, for instance, by a crank (not shown) or the like, the cogwheel half 8 engaged therein turns and consequently the top 2 and the wall 3a turn as well.

[0024] Figure 7 shows a schematic view of a turning arrangement which comprises a hydraulic cylinder arrangement. The arrangement comprises a hydraulic cylinder 12 which is secured between the top 2 and the container. The top 2 and the wall 3a secured thereto can be turned by means of the hydraulic cylinder.

[0025] Other turning arrangements or combinations of various turning arrangements can also be used in place of these three turning arrangements.

[0026] In Figure 11 the turning arrangement also comprises a spring arrangement 23 which is arranged to be under tension when the container is closed, whereby energy stored in the spring can be utilized in opening the container. Advantageously, the spring arrangement 23 is also arranged to become tensioned when the container is opened at the maximum, whereby the spring force can be utilized correspondingly in closing the container.

[0027] In Figure 11 is the hinge mechanism 4 arranged so that the top 2 and the wall 3a does not rise so high when opening the container. In other words the hinge mechanism 4 is not attached in the vicinity of one edge of the top, but at a distance from the edge. The hinge arrangement 4 comprises an rod arrangement 24 for guiding the top 2 and the wall 3a when opening and closing the container.

[0028] Advantageously, the container comprises two turning arrangements, which are placed on either side of the top 2 and the wall 3a to be turned upwardly. In the container of Figure 2, the two turning arrangements could be placed at walls 3b and 3c, for instance.

[0029] If the container comprises two turning arrangements, it advantageously comprises a synchronizing arrangement for synchronizing the turning arrangement such that they operate at the same rate. In the arrangement of Figure 3, the synchronizing arrangement may comprise an axle (not shown) which connects the cogwheels 6 such that they rotate at an equal rate. Said axle is advantageously positioned such that it is not in the middle of the container but, for instance, at the edge which carries the hinging between the top 2 and the container. The rotating movement of the cogwheel 6 can be transmitted onto the axle located at this point by means of a chain (not shown) or a cogwheel (not shown), for instance. In the arrangement of Figure 4, the synchronizing arrangement may comprise, for instance, an axle

(not shown), onto which cogwheels 10 are mounted such that the cogwheels 10 rotate at the same rate.

5       **[0030]** Advantageously, the turning arrangement also comprises a stopping arrangement (not shown), which is arranged to hold the top 2 and the side 3a in place when the container is open such that the container will not close accidentally or open excessively while being loaded or unloaded.

10       **[0031]** Advantageously, the container comprises a sealing arrangement (not shown) for sealing the gap between the turnable top 2 and the wall 3a. The sealing arrangement may comprise, for instance, a rubber sealing or a sealing made of a similar flexible material between the turnable top 2 and the wall 3a.

15       **[0032]** Advantageously, the container comprises a locking arrangement (not shown) for locking the turnable top 2 and the wall 3a turnable therewith to the container while it is closed. The locking arrangement prevents the container from opening intentionally and unintentionally.

20       **[0033]** Advantageously, the container further comprises movable load supports 13 that are secured to be movable inside the container (not indicated by reference numeral). For instance, these load supports 13 are movably secured to rails 14 on the floor (not indicated by a reference numeral) inside the container such that the load supports 13 can slide along the rails 14. The load supports 13 can be in the form of poles as shown in Figure 8. Alternatively, the load supports 13 can be in the form of plates (not shown) such that one plate is movably secured to at least two rails 14. Advantageously, the rail 14 is substantially in parallel with one of the container walls 3a to 3d. Advantageously, there are a plurality of these rails 14 and the rails 14 are advantageously arranged such that they are substantially both parallel and transversal with respect to one another. In this manner it is possible to support the load from all sides (sides and ends of the load) and to reduce the capacity of the container.

30       **[0034]** Figure 8 shows the load support 13 in the form of a pole. The load support 13 of Figure 8 locks into place by means of a rod arrangement 15 inside the load support. The rod arrangement 15 also comprises a spring 16 which is arranged to press the bar arrangement 15 down into a hole 17 in the rail such that the rod arrangement 15 locks the load support 13 into place in the rail 14.

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[0035] By using load supports 13 of this kind it is possible to hold the load to be entered in the container in place with a smaller amount of packing material or even without packing material, such as timber, which is commonly used for locking a heavy load into place in the container. For instance, in the container of Figure 9 the load can be placed between the load supports 13.

[0036] Advantageously, the load supports 13 are such that the top 2 carries means 18 that are arranged to lock the load supports when the container is closed by lowering the top 2. This provides more sturdy load supports 13. In Figure 10 does the means 18 that are arranged to lock the load supports comprise recesses in the top 2

[0037] The container of the invention advantageously comprises at least one recess 19, a cradle or the like, for holding in place cylinder-shaped goods 20, such as reeled goods. Figure 10 shows a container having six recesses 19 of this kind. In Figure 10 is the container shown from the side with its turnable top 2 and wall 3a turned up.

[0038] The recess 19, the cradle or the like, can advantageously be covered with at least one covering plate 21, or the like, such that it is possible to place goods 22 on the covering plate 21 or the like, when goods 22 requiring a flat base are to be transported in the container additionally or solely. Figure 10 shows a container, in which each recess 19, cradle or the like, can be covered with a two-part covering plate 21.

[0039] It is obvious to a person skilled in the art that as technology advances the basic idea of the invention can be implemented in a variety of ways. The invention and its embodiments are thus not restricted to the above-described examples but they may vary within the scope of the claims.

## CLAIMS

1. A cargo freight container comprising a bottom (1), a top (2) and four walls (3a to 3d), **characterized** in that at least part of the top (2) and at least part of one wall (3a) can be turned upwardly off the container in order to open it, and correspondingly, downwardly in order to close it.

2. A cargo freight container as claimed in claim 1, **characterized** in that the top (2) is substantially completely turnable.

3. A cargo freight container as claimed in claim 1 or 2, **characterized** in that the wall (3a) is substantially completely turnable together with the top (2) or a part of said top (2).

4. A cargo freight container as claimed in any one of claims 1 to 3, **characterized** in that the top (2) is attached to the container with a hinge mechanism (4) in the vicinity of the edge between the wall (3d) and the top (2), said edge being opposite to the edge between the top (2) to be turned upwardly and the wall (3a) to be turned upwardly therewith.

5. A cargo freight container as claimed in any one of claims 1 to 4, **characterized** in that the wall (3a) is substantially fixedly secured to the top (2).

6. A cargo freight container as claimed in any one of claims 1 to 5, **characterized** by comprising a turning arrangement for turning the top (2) or a part thereof together with the wall (3a) or a part thereof in order to open the container and for turning down the top (2) or a part thereof together with the wall (3a) or a part thereof in order to close the container.

7. A cargo freight container as claimed in claim 6, **characterized** by comprising two turning arrangements.

8. A cargo freight container as claimed in claim 7, **characterized** by comprising a synchronizing arrangement for synchronizing the turning arrangements.

9. A cargo freight container as claimed in any one of claims 1 to 8, **characterized** by comprising a spring arrangement (23) which is arranged to store energy when the container is closed and which is arranged to release the energy stored therein when the container is opened in order to facilitate opening.

10. A cargo freight container as claimed in any one of claims 1 to 8, **characterized** by comprising a spring arrangement (23) which is

arranged to store energy when the container is opened and which is arranged to release the energy stored therein when the container is closed in order to facilitate closing.

11. A cargo freight container as claimed in any one of claims 1 to 5 10, **characterized** by comprising at least one movable load support (13) for supporting the load in the container.

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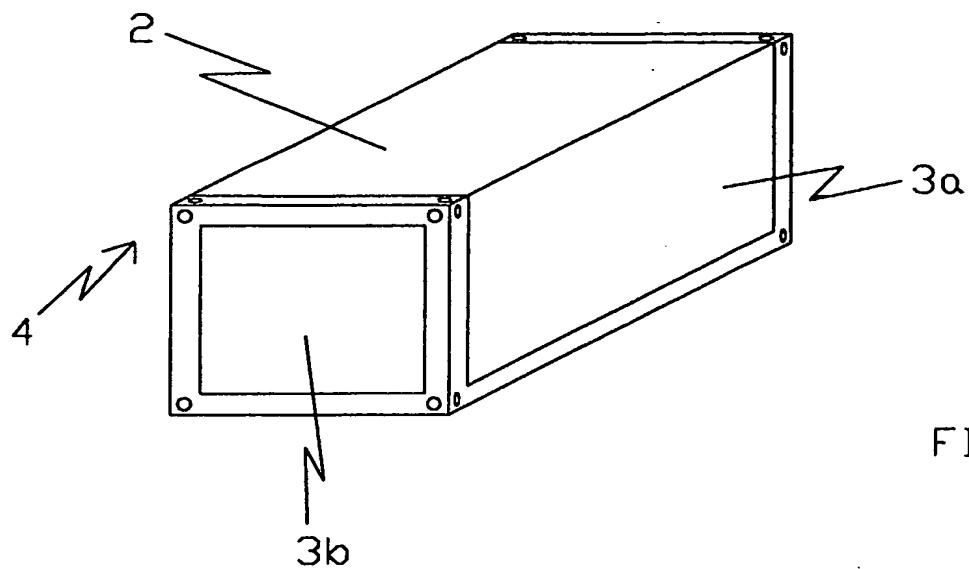


FIG 1

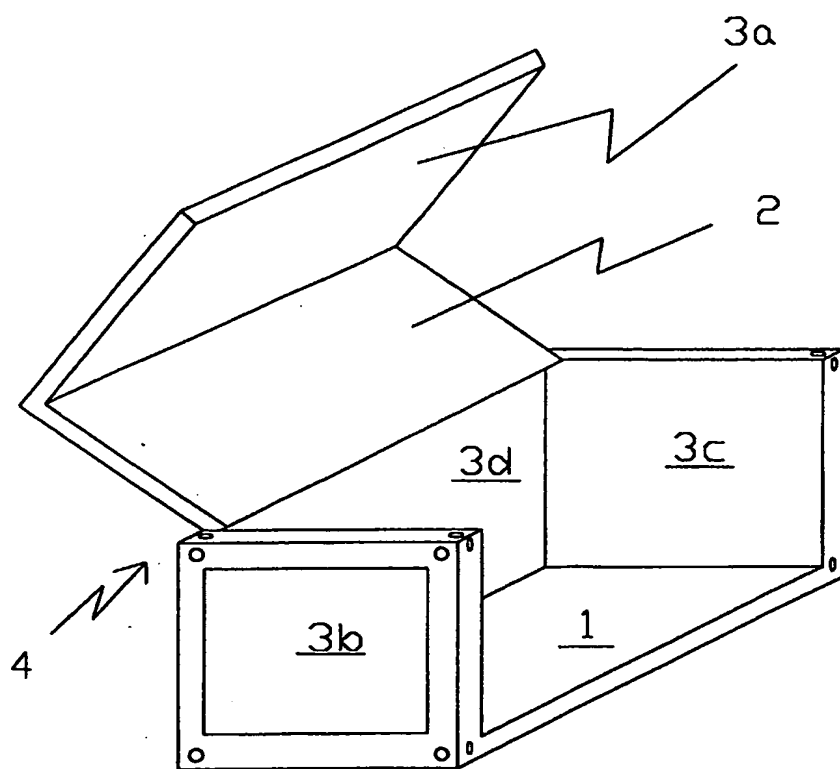


FIG 2

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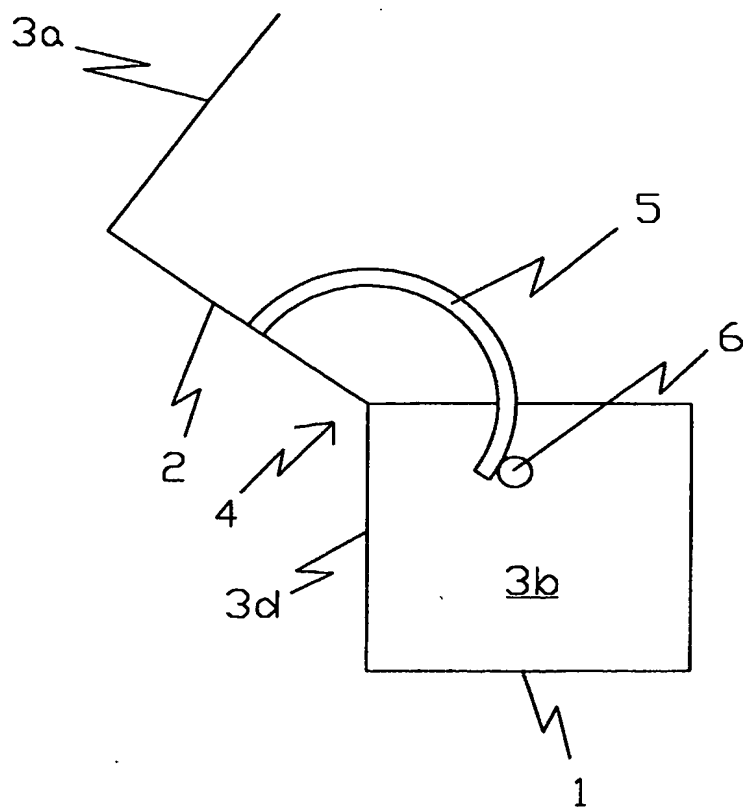


FIG 3

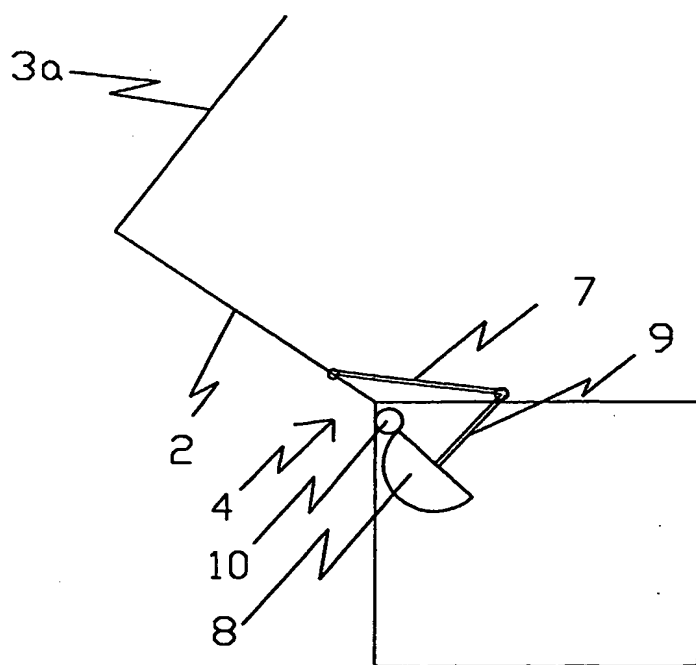


FIG 4

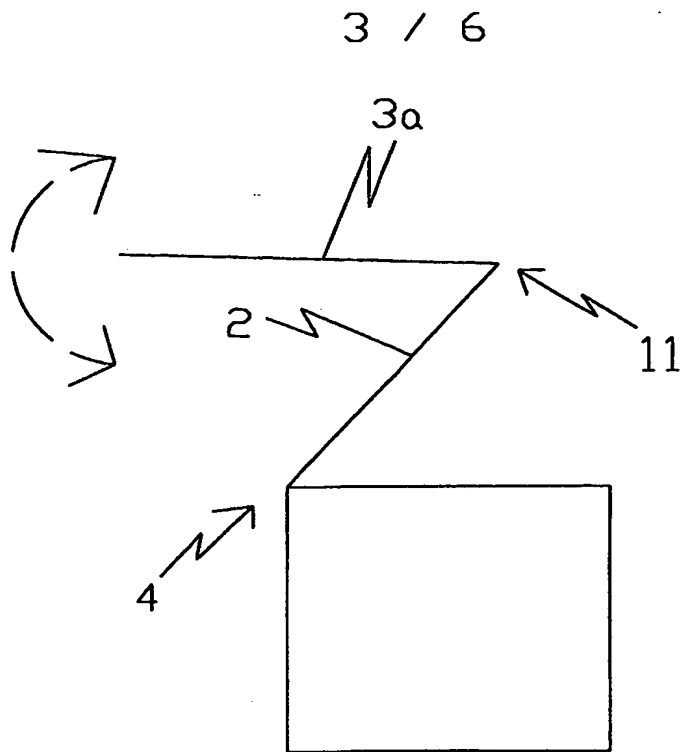


FIG 5

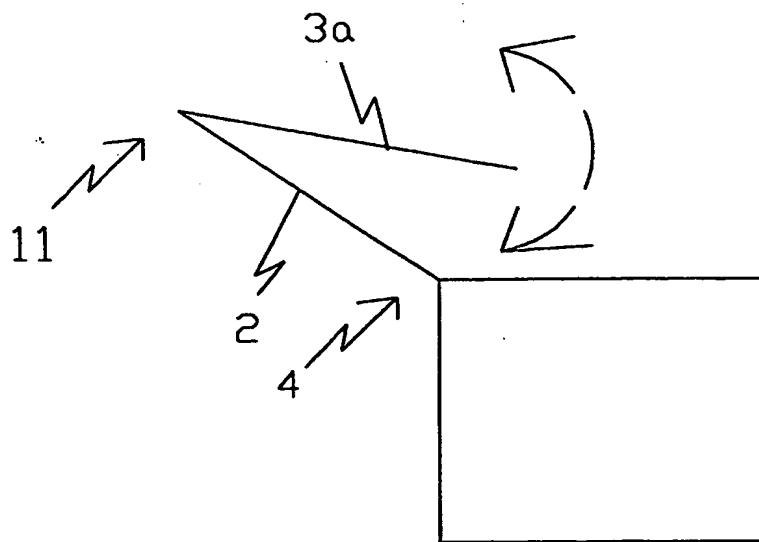


FIG 6

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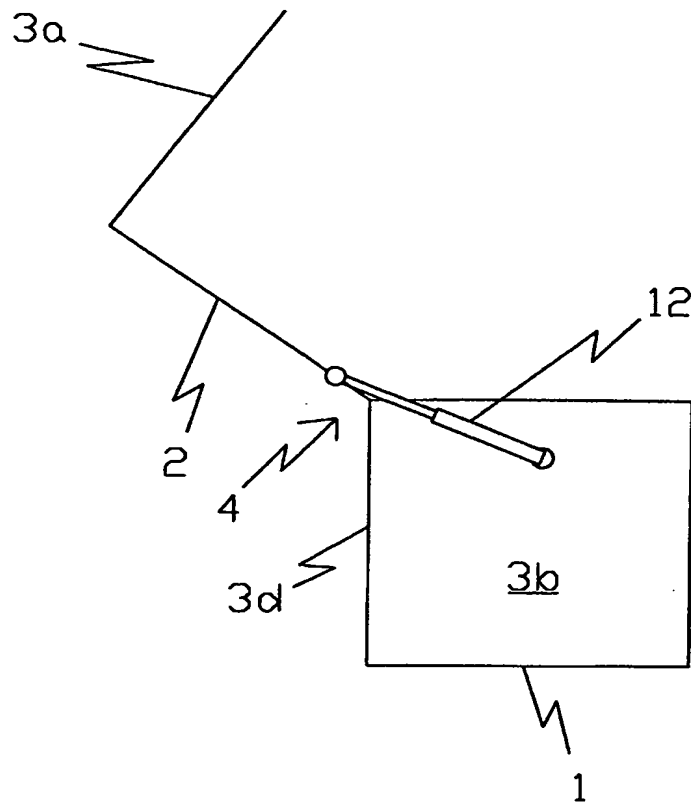


FIG 7

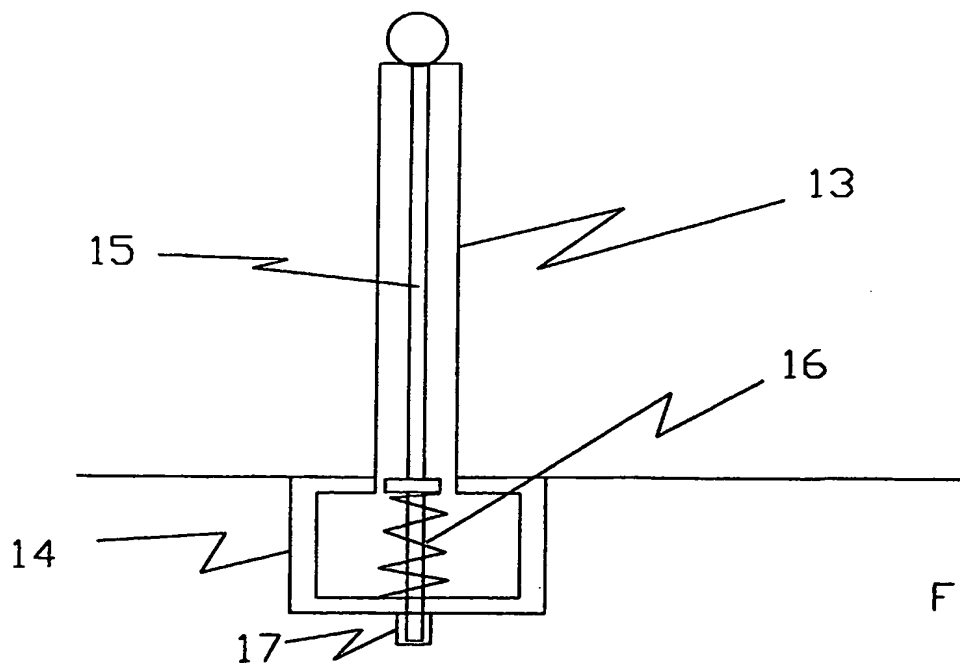


FIG 8

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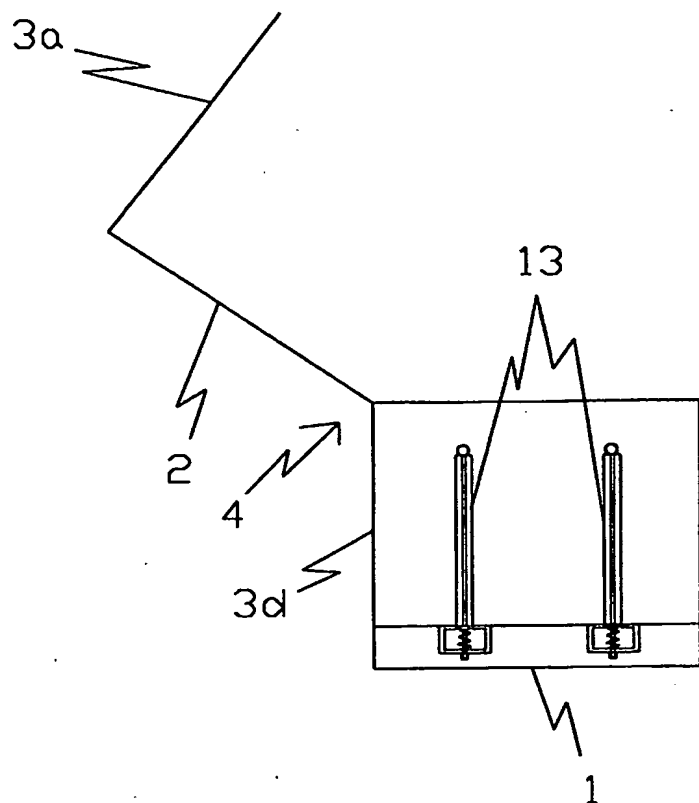


FIG 9

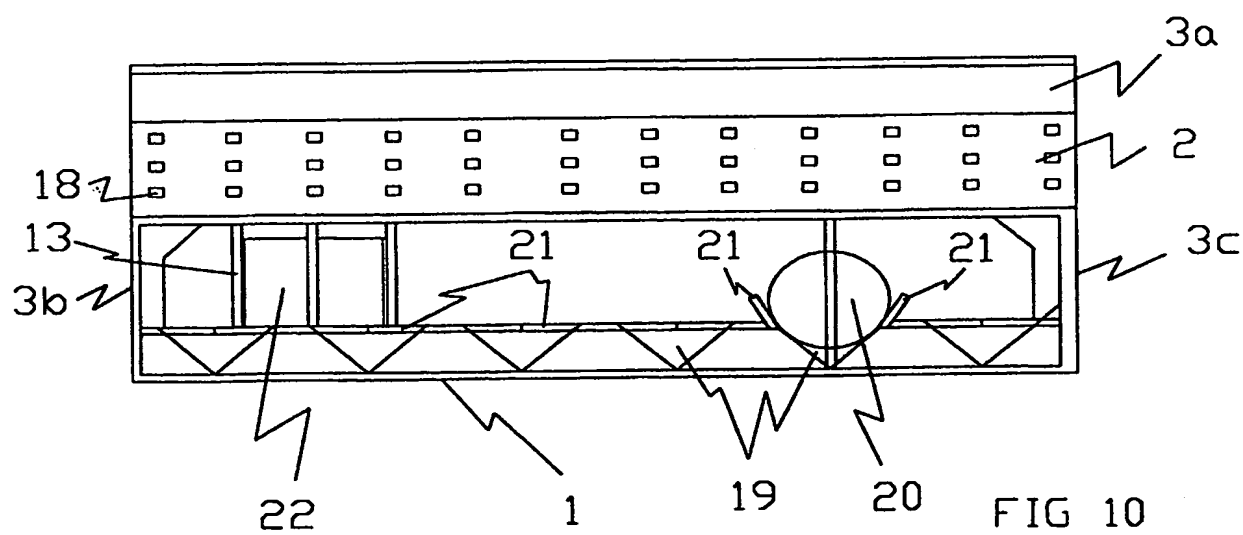
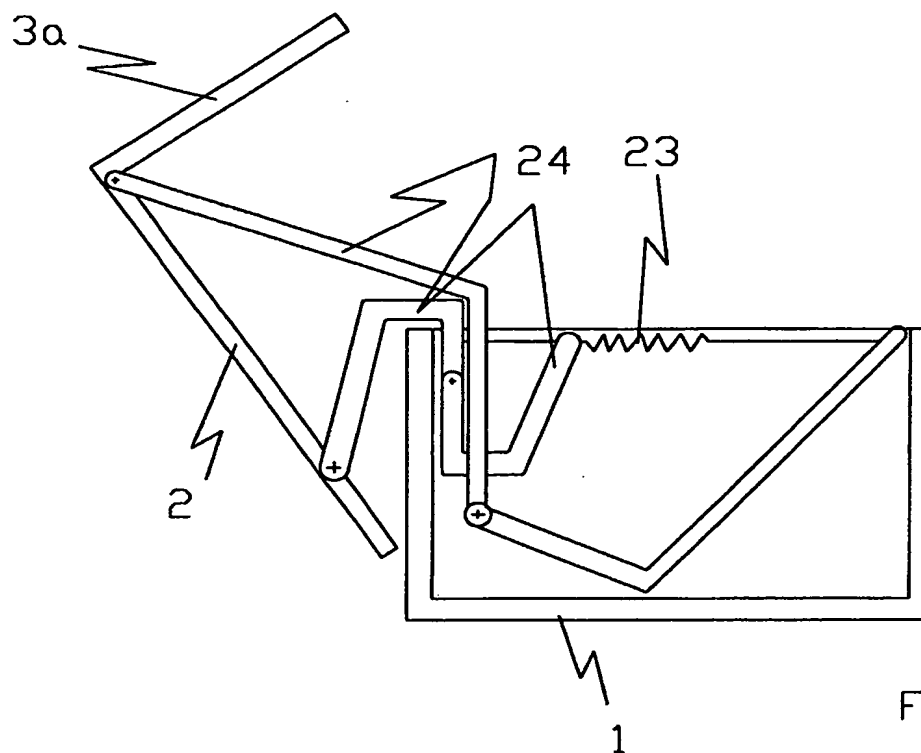


FIG 10



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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 01/00416

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65D 88/12, B65D 88/54

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65D, B65F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA

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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

14 August 2001

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Name and mailing address of the ISA/  
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Facsimile No. +46 8 666 02 86

Authorized officer

Anders Brinkman/MP  
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## INTERNATIONAL SEARCH REPORT

International application No.

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